Amendments to the Claims:

The following Listing of Claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims

1. (Previously Presented) A radiation curing apparatus, comprising:

a plurality of solid state radiation sources to generate radiation that cures a first material;

a plurality of optical concentrators, wherein each concentrator receives radiation from a corresponding one of said solid state radiation sources;

a plurality of optical waveguides, wherein each of the plurality of optical waveguides includes a first end and a second end, wherein each first end receives concentrated radiation from a corresponding concentrator;

a support structure to stabilize the plurality of optical waveguides between the first and second ends;

an interconnect circuit layer to provide electrical connection to the plurality of solid state radiation sources, the interconnect circuit layer comprising a dielectric top layer between each solid state radiation source, an electrically conductive adhesive between the solid state radiation source and a conductive layer that carries electrical current to the solid state radiation source, and a substrate layer beneath the conductive layer;

a heat exchange unit; and

a thermally conductive material to thermally couple the substrate layer of the interconnect circuit layer to the heat exchange unit.

2. (Original) The radiation curing apparatus according to claim 1, wherein the plurality of solid state radiation sources comprises a plurality of LED dies.

3. (Previously Presented) The radiation curing apparatus according to claim 1, wherein the thermally conductive material is a thermally conductive adhesive to thermally couple and bond the substrate layer of the interconnect circuit layer to the heat exchange unit, and

wherein the heat exchange unit comprises heat dissipation pins extending in a direction opposite that of the optical waveguides.

4. (Original) The radiation curing apparatus device according to claim 1, wherein the plurality of waveguides comprises a plurality of optical fibers.

5. (Original) The radiation curing apparatus according to claim 4, further comprising a fiber array connector to support the first ends of the plurality of fibers in a defined pattern.

6. (Original) The radiation curing apparatus according to claim 5, wherein the support structure comprises a housing that encloses at least a portion of the plurality of optical fibers.

7. (Original) The radiation curing apparatus according to claim 1, further comprising a heat exchange unit disposed opposite to a direction of the emitted radiation.

8. (Original) The radiation curing apparatus according to claim 5, further comprising a banding to surround and secure at least the first portion of the second ends of the fibers.

9. (Previously Presented) The radiation curing apparatus according to claim 8, wherein the banding is reconfigurable.

10. (Original) The radiation curing apparatus according to claim 1, further comprising:

first and second alignment pins disposed longitudinally along a length of the radiation curing apparatus, wherein the interconnect circuit layer includes alignment holes to receive the alignment pins.

11. (Original) The radiation curing apparatus according to claim 1, further comprising:

an optical element to collect and distribute optical radiation from the optical waveguide second ends in a selected light distribution pattern.

12. (Original) The radiation curing apparatus according to claim 1, wherein solid state radiation sources emit a high intensity irradiance profile that cures the first material in cross-machine and machine directions.

13. (Original) The radiation curing apparatus according to claim 4, wherein the second ends of the fibers are bundled to provide a uniform output beam across the fiber array.

14. (Currently Amended) The radiation curing apparatus according to claim 2, ~~further comprising~~:
wherein the plurality of LED dies is arranged in a first grouping and a second grouping, wherein the first grouping of LED dies is connected to a first portion of the interconnect circuit layer and the second grouping of LED dies is connected to a second portion of the interconnect circuit layer.

15. (Original) The radiation curing apparatus according to claim 14, wherein a first output intensity of at least one LED die of the first grouping of LED dies is controllable separate from a second output intensity of at least one LED die of the second grouping of LED dies.

16. (Original) The radiation curing apparatus according to claim 15, wherein the first material receives uniform radiation when one of said groupings of LED dies is not activated.

17. (Original) The radiation curing apparatus according to claim 2, wherein at least a portion of the plurality of LED dies comprise ultraviolet emitting LED dies.

18. (Original) The radiation curing apparatus according to claim 4, wherein the first material is disposed on a non-uniform structure and wherein the second ends of the fibers are patterned to uniformly irradiate the first material.

19. (Previously Presented) A radiation curing system, comprising:
a solid state ultraviolet radiation source, comprising

a plurality of LED dies to generate ultraviolet radiation that cures a radiation curable chemical formulation;

a plurality of optical concentrators within a concentrator array body, wherein each concentrator receives ultraviolet radiation from a corresponding one of said LED dies and wherein the concentrator array body has a depression where each optical concentrator is located;

a plurality of optical fibers within a fiber array connector, wherein each of the plurality of optical fibers includes a first end and a second end, wherein each first end receives concentrated ultraviolet radiation from a corresponding concentrator and wherein the fiber array connector includes a protrusion where each first end is located and wherein the protrusion of the fiber array connector is seated within the depression of the concentrator array body such that each concentrator is aligned with each fiber end; and

a substrate to support the radiation-curable chemical formulation.

20. (Original) The radiation curing system according to claim 18, further comprising a controller, coupled to the solid state light source, to selectively activate one or more groups of the plurality of LED dies.

21. (Original) The radiation curing system according to claim 20, wherein the controller is adapted to selectively activate a first group of LED dies to emit radiation corresponding to a first absorption band of a first radiation-curable chemical formulation.

22. (Original) The radiation curing system according to claim 21, wherein the controller is adapted to selectively activate a second group of LED dies to emit radiation corresponding to a second absorption band of a second radiation-curable formulation.

23. (Original) The radiation curing system according to claim 19, further comprising a heat exchange unit coupled to the solid state light source that is disposed opposite a direction of output radiation.

24. (Original) The radiation curing system according to claim 20, wherein the controller selectively activates a first LED die grouping in response to a trigger signal.

25. (Original) The radiation curing system according to claim 20, wherein the controller sends an increased drive current to a first LED die channel to compensate for a reduced emission output from a second LED die channel.

26. (Previously Presented) The radiation curing system according to claim 19, wherein the plurality of fibers output a selected steerable illumination pattern and wherein the plurality of fibers are contained within a housing having protrusions on a first end, the fiber array connector having depressions on each side on an end opposite the end where the protrusions of the fiber array connector are located, the protrusions of the housing being seated within the depressions of the fiber array connector.

27. (Original) The radiation curing system according to claim 19, wherein the substrate is disposed on a movable platform.

28. (Original)The radiation curing system according to claim 19, wherein the substrate is suspended between movable rollers.

29. (Previously Presented) The radiation curing system according to claim 19, further comprising a lens interposed at a selected distance between the second ends of the fibers and the radiation-curable material that relays the radiation from the second ends to the radiation-curable material.

30. (Original) The radiation curing system according to claim 20, wherein the radiation-curable chemical formulation is disposed on a non-uniform structure and wherein the second ends of the fibers are patterned to uniformly irradiate the radiation-curable chemical formulation.

31. (Previously Presented) A method of curing a radiation curable chemical formulation, comprising:

providing a solid state radiation source that includes a plurality of LED dies to generate curing radiation and being mounted on an interconnect circuit layer having at least two alignment holes, a plurality of optical concentrators within an optical concentrator array body having at least two alignment holes in alignment with the at least two alignment holes of the interconnect circuit layer, wherein each concentrator receives curing radiation from a corresponding one of said LED dies, a plurality of optical fibers, wherein each of the plurality of optical fibers includes a first end and a second end, wherein each first end is located within a fiber array connector having at least two alignment holes in alignment with the at least two alignment holes of the optical concentrator array body and wherein each first end receives concentrated curing radiation from a corresponding concentrator, and at least two alignment pins disposed within the at least two alignment holes of the interconnect circuit layer, the optical concentrator body, and the fiber array connector; and

exposing the radiation-curable chemical formulation to the curing radiation, wherein a substrate supports the radiation-curable chemical formulation.

32. (Original) The method according to claim 31, wherein providing a solid state radiation source further comprises providing a first group of LED dies to emit curing radiation corresponding to a first absorption band of a first radiation-curable chemical formulation.

33. (Original) The method according to claim 32, wherein providing a solid state radiation source further comprises providing a second group of LED dies to emit curing radiation corresponding to a second absorption band of a second radiation-curable chemical formulation.

34. (Original) The method according to claim 32, further comprising selectively controlling a curing radiation output of the solid state radiation source.

35. (Original) The method according to claim 34, further comprising selectively activating one or more groups of the plurality of LED dies.

36. (Original) The method according to claim 34, further comprising providing a steerable illumination pattern.

37. (Original) The method according to claim 31, wherein the exposing the radiation-curable chemical formulation to the curing radiation comprises emitting a substantially uniform, high intensity irradiance profile that cures the radiation-curable chemical formulation in cross-machine and machine directions.